

U.S. Serial No. 10/765,838
Amendment
Response to 8-2-05 OA

Atty. Docket No. 740165-372:

REMARKS

The objections to claims 8 and 15 have been obviated by revising these claims in accordance with the suggestions given by the Examiner in the last Office Action.

The rejection of claims 1, 2, 7-9 and 14-16 under 35 USC § 102(e) over the Limburg '262 patent has been obviated by revising independent claims 1, 8 and 15 to more clearly distinguish the invention from the prior art of record. However, before the revisions to the claims are discussed, a brief recap of the principal features and advantages of the invention will be made so that the language used in the amendment may be more fully appreciated.

Generally speaking, the invention is an electrically-driven steering lock device that uses a combination of an urging device, such as a spring, a lock arm provided on a gear that is engageable with a lock stopper connected to the lock bar, and a cam likewise provided on the gear which is also engageable with the lock stopper. Figures 5A - 5C illustrate the normal operation of the device. Here, arm 52 connected to gear 46 depresses on lock stopper 18 to push lock bar 28 into a groove 40 of steering column 38. When it is desired to release the lock bar 28 from the steering column 38, the gear wheel turns in the direction indicated in Figure 5B, which in turn releases the lock arm 52 from the lock stopper 18. An urging device in the form of spring 44 pulls the lock stopper 18 away from the steering column 38, and hence the lock bar 28 out of the groove 40 as illustrated in Figures 5B and 5C. However, in the event that the lock bar 28 becomes stuck in the groove 40 of the steering column due to tortional forces "R", as shown in Figure 6A, the spring 42 may be insufficient to disengage the lock bar 28 from the groove 40 when the lock arm 52 is disengaged from the lock stopper 18, as illustrated in Figure 6B. Accordingly, a cam 60 provided on the gear wheel 46 proceeds to disengage the lock bar 28 from the steering shaft 38, as is illustrated in Figure 6C. A primary advantage of the invention is that the cam 60 is not used to disengage the lock bar 28 from the groove 40 unless the type of sticking or jamming illustrated in Figure 6A occurs.

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Claim 1 has been amended to more specifically recite the functional features of the invention which result in the aforementioned advantage. Claim 1 now recites a lock stopper, a lock bar, an urging device that urges the lock stopper toward the side opposite the steering shaft "such that the lock bar is urged in a disengagement direction with respect to said engagement groove of said steering shaft"; a gear driven to rotate by a drive source, lock arm interlocked with the gear so as to engage the lock stopper toward the steering shaft when the gear is forward rotated, and to disengage the lock bar from the lock stopper when reverse rotated "such that the urging device urges the lock bar in said disengagement direction ..."; and a cam provided so as to be interlocked with the gear and so as to be engageable with the lock stopper wherein

"the cam moves the lock stopper toward the side opposite the steering shaft to disengage the lock bar from said engagement groove of said steering shaft only when an urging force applied by said urging device is insufficient to disengage said lock bar from said groove."

None of the references of record either discloses or suggests the electrically-driven steering lock device recited in amended claim 1. The Limburg '262 patent discloses only a steering wheel lock wherein a locking element 4 is, in all cases, forcefully removed from the locking aperture 12 of a steering shaft by forces generated from the camming action of the bottom surface of the channel 43 against the cylindrical cross pin 41, which withdraws the drive element 10 and applies a withdrawal force on the cross pin 22 via slot surfaces 32, 33 (see Figures 3 and 10). In no case is there any opportunity for the camming action of the channel 43 to operate "only when" the urging force applied by the spring 84 is insufficient to remove the locking element 4 from the steering shaft. For this reason alone, amended claim 1 is clearly patentable over the Limburg '262 patent.

Claim 2 is patentable at least by reason of its dependency upon claim 1.

As claims 3-6 have been deemed to recite patentable subject matter by the Examiner, no further discussion of these claims is deemed necessary.

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Claim 7 is patentable at least by reason of its ultimate dependency upon claim 1.

Independent claim 8 includes all of the limitations of independent claim 1, and further specifies that the cam moves the lock stopper "after said lock arm disengages said lock stopper, ...". By contrast, both the channel 43 and spring 84 of the '262 patent operates simultaneously to remove the locking element 4 from the aperture 12 of the steering shaft. As there is no disclosure or suggestion of any such sequential action between the camming surfaces of the channel 43 and the cross-pin 41 and the spring 84, all of the arguments applied with respect to amended claim 1 apply with even greater force to amended claim 8.

Claim 9 is patentable at least by reason of its dependency upon amended claim 8.

As the Examiner has previously indicated that claims 10-13 recite patentable subject matter, no further discussion of these claims is deemed necessary.

Claim 14 is each patentable at least by reason of its dependency upon amended claim 8.

Claim 15 has been amended to include all of the claims of claim 8, and hence is patentable for all the reasons given with respect to that claim.

Claim 16 is patentable by virtue of its dependency on claim 15.

As claims 17-20 were indicated as reciting patentable subject matter in the last Office Action, no further discussion of these claims is deemed necessary.

Now that all the claims are believed to allowable, the prompt issuance of a Notice of Allowance and Issue Fee Due is hereby earnestly solicited.

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The Commissioner is authorized to charge any overage or shortage of fees connected with filing of this Amendment to Deposit Account No. 19-2380.

Respectfully submitted,

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